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A SOLAR POWERED MINI SMART E- PODIUM WITH A WIRELESS LECTURE TRANSMITTER

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ABSTRACT
To get an effective learning experience, conscious work on the part of the teacher and students is required. The purpose of this article is to present the design and construction of a solar powered mini classroom/corporate e-podium. This paper describes how the proposed e-podium exactly mimics ideas and perceptions about the ways lecturers and students work with the podium within the classroom setting to deliver better educational experiences. The e-podium has software that allows each lecture to be transmitted live to the audience via a wireless link. Any mobile device or laptop can be on the same page with the lecturer, especially in very large classroom settings.

KEYWORDS: e-Learning; software; Wireless transmission, e-podium.

INTRODUCTION

A podium is a raised platform behind which a person stands and place materials while delivering a speech or a lecture. It is a symbol of the centre of attraction in a hall or venue towards which everyone present looks for instruction, direction and information. The e-Podium is a tool used in education and learning environments. It can also be used to connect to other technical tools based on its complexity. The impact of this technology in education is an explorative process. Therefore, this article captures ideas and perceptions about the way professors and students work with the podium within the classroom setting for better educational experiences. Individuals are able to recognize upgraded teaching standards when they see one. The mini smart electronic podium is an eye-catching open address podium that has an all in one design. Its unique design makes it easy to enlarge its capacity. This e-podium has a wireless microphone system. That means the speaker is free to walk about the room while using the system's audio capabilities. This article describes the creation of a wireless e-podium management system with an android based application which gives presenters full control of the podium and connected devices. This allows them to interact fully with the audience without running back to the podium to change a setting.

LITERATURE REVIEW

The word "lectern" originated from a Latin word "legree" which means to read [1]. Traditionally, lecterns have been related to reading of materials. It is normally used for podium or speaker stands. It was first

utilized as a part of religious functions for offering religious teachings. The highest point of the podium gives a helpful place for a speaker to place scrolls and books. The Podium has dependably been used for addresses [1]. Nowadays, current podiums need to be able to do a large number of specialized stuff other than simply holding the speaker's notes. Extra functions that podiums need to be able to carry out now include; hosting a computer. Some materials used for the construction of podiums include wood, acrylic, and metal. Different studies have been directed to the area of educational encounters inside digital classrooms. General writings with respect to the outline and improvement of educational encounters have been a subject of great concern lately. One regular article centered on the utilization of certain technical tools as opposed to the general tools used in the educational system. Mary Ann Bell from Baylor University [2] surveyed educators' utilization and observations with respect to the digital classroom. In her examination, she discovered that responsiveness and the capacity to check and spare documentations were the pivotal highlights of digital classrooms as recognized by educators. Ann Bell similarly pointed out the utilization of electronic boards. According to her examination, instructors recommended the need for electronic boards and utilizing it properly to get its full potential in the learning experience.

Other examinations conducted assessed the impact of a smart board in class action; the producers found that this tool animated the learning process. These discoveries were credited to the accuracies of the goings-on that encompassed the learning experience. Anna Smith also surveyed the routes by which the electronic board advancement was consolidated into the educational system of a number of territories. Anna discovered that by using the smart board, educators were incorporating innovations in communication engineering into their teachings. This makes it possible to apply more graphical techniques to learning. But teachers also determined that moving the board was difficult. Notwithstanding the utilization of audiovisual aid to enrich classroom presentations, a couple of tasks bring ups the option of an e-podium [2]. This article discusses an equipment and programming design for an e-podium and for the most part investigates the employment of various ways to save and recover classroom learning efficiency. The faculty is given this extraordinary tool to enables them catch comments, clarifications, and interactions during classroom sessions. It reduces the need of taking notes in class and shifts focus to urging students to partake actively in class presentations. The e-podium has the capacity to make classroom experiences more productive for students.

THE AUDIO POWER AMPLIFIER

Amplifier strengthens low-control sound signals (signals made essentially out of the human range of hearing which is 20—200khz) in a more appropriate way for running speakers. It is the last electronic stage in a usual sound playback chain. Power Amplifier (also known as a large signal amplifier), conveys power to the load, and it is also the result of the current and voltage applied to the load with the output signal power being more noticeable than the input signal power. Therefore, a power amplifier strengthens the input signal power and makes it more useful in audio amplifier output stages to drive loudspeakers [3-6]. The power amplifier changes the DC power drawn from the power supply into an AC voltage signal conveyed to the load.

The first stages are low power amplifiers, which perform tasks like pre-intensification (this is mostly connected with record turntable signals), equalization, tone controls, mixing/effects, or sound sources like record players, CD players, and cassette players. Most amplifiers require these low-level inputs to hold fast to line levels. There are various types of amplifiers, in which their circuit designs and strategies for the task of amplification distinguish them. There are numerous types of electronic circuits classed as amplifiers, from operational amplifiers and small signal amplifiers to large signal and power amplifiers. The characterization of an amplifier depends on the measure of the signal, expansive or little, its physical setup and how it forms the input signal, which is the association between input signal and current streaming in the heap. For upgraded execution, a sound amplifier ought to have the accompanying highlights:

- It ought to have very low harmonic distortion and intermodulation distortion.
- It ought to have uniform frequency response above the whole acoustic range as of 20 Hz to 20 kHz, +/-5 Db.
- It ought to have maximum power output above the whole acoustic range minus clear distortion.

- It ought to be stable under practical load state.
- It ought to add very minute or no noise to the input signal.

The routine terms organized by the producer of a sound power amplifier ranges from a rare set to a genuinely point-by-point list. The primary details incorporate most extreme power, frequency response, signal to noise ratio, and distortion [7].

THE LOUDSPEAKER

The term loudspeaker is commonly used to define both the loudspeaker unit and the loudspeaker system. A loudspeaker system consists of a cabinet or enclosure within which the loudspeaker units operate. The system may contain either a single unit, or two or more of them, which depends on the design, cost and requirements. The loudspeaker converts the electrical energy into acoustical energy.

THE MICROPHONE SYSTEM

A wireless microphone lacks a physical cable, which connects it directly to the sound recording or amplifying equipment with which it is associated. The dynamic microphone to electret microphone input is a simple microphone preamplifier circuit, which you can use between your dynamic microphone and any equipment designed to work with an electret microphone (two-wire connection to electret capsule). It amplifies the low level signal to the levels used by electret microphone input and uses the power from the device [9].

SOLAR PANELS

Solar panels are created to harness the light energy from the sun in order to generate electricity using the principle of photoelectric effect. Solar panels are semiconductor devices that harness the use of photoelectric effect to generate electricity, however before these devices were developed; photo electricity did have to be discovered and authentic. Solar panels or more technically photovoltaic (pv) panels are a solar home electric system's enabling component. Panels are made of wafers or cells of semiconductor material that use sunlight (photons) and the photovoltaic effect to generate direct current (dc) electricity. Panels are assigned a power rating in watts based on the maximum power they can produce under ideal temperature conditions [10-14].

METHODOLOGY

DESIGN SPECIFICATIONS

This article focuses on the design specifications, which includes the construction and modelling of the system. The system consists of two major parts namely:

- Hardware subsystem
- Software subsystem

HARDWARE SUBSYSTEM

The hardware subsystem consists of various components combined together to perform the required function. The components include:

- Audio amplifier (lepy amplifier)
- Input DC 9-14.4V, 2A
- Frequency 20Hz-20KHz
- Input Impedance 47kΩ
- Speaker Impedance 2-8Ω

2. Solar Panel

- Maximum Power 130W
- Open Circuit voltage 22.1v
- Short Circuit Current 8.04A
- Rated Voltage 17.8v
- Rated Current 7.48A
- Maximum system voltage 600v

- Wireless Microphone System
- Battery voltage 9v
- Battery life 30hrs
- Power supply AC 220v/50Hz

4. Router
5. DC to AC inverter 12v/220v
6. Column speaker
7. Solar charge controller

DESCRIPTION OF COMPONENTS

1. AUDIO AMPLIFIER:

The major function of the amplifier is to strengthen the sound signal, which is used to drive the column speaker. Its input DC is 9-14.4v, which makes it workable with the 12v battery, see figure 1 below.

Figure 1: The Audio Amplifier

2. DC TO AC CONVERTER:

The most efficient way to de1iver electrica1 power to the podium is alternating current (AC) but the podium is solar powered, therefore DC is the main operator of the electrica1 devices in the podium, which brings the need for a solar inverter. A so1ar inverter converts the direct current output of a so1ar pane1 into alternating current that can be fed to the podium equipment in the podium. Figure 2 shows a solar inverter.

Figure 2: Solar Inverter

3. A SOLAR CHARGE CONTROLLER

A Solar Charge Controller: The charge controller gives a regu1ated DC yield and stores abundance vitality in a battery. It also checks the battery's vo1tage while and after charging.

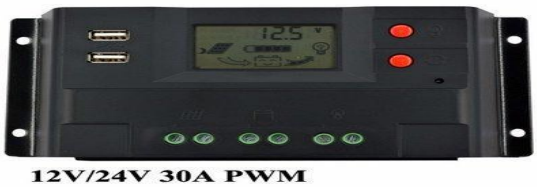

Figure 3: Solar Charge Controller

MODEL OF THE PROPOSED WIRELESS E-PODIUM

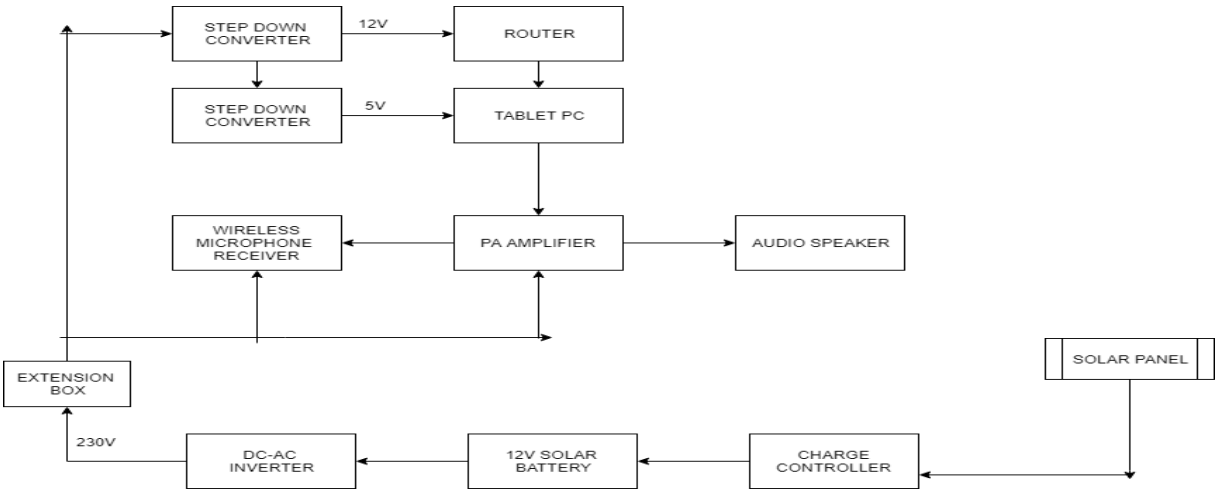

Figure 4: Block Diagram of the Podium Design

The block diagram above (figure 4) shows the working principle of the podium. The solar panel harnesses light energy from the sun in other to generate electricity. The solar charge controller in the podium makes sure maximum power is transferred to the solar battery. The inverter is connected to the battery to allow the AC devices in the podium to work with the 12v battery.

RESULTS

Figure 5: The Constructed e-Podium

SOFTWARE IMPLEMENTATION

The screen task application allows students to enter an IP address into a browser on their devices after connecting to the access point to view PC images being shown on the podium's tablet. The window shown in Figure 6 will appear, showing the Screen Task application has launched:

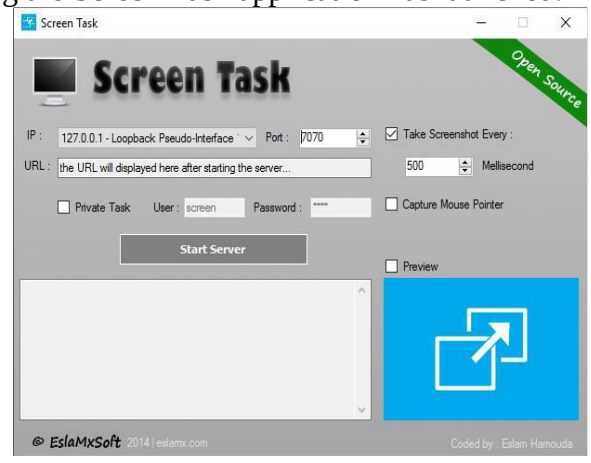

Figure 6: Application Window for the Constructed e-Podium

Find and select the 'Ethernet' address in the 'IP' dropdown box as shown in figure 7 below; Click in the 'Preview' check box; then click on the 'Start Server' button. The screen should look like this when then server successfully starts:

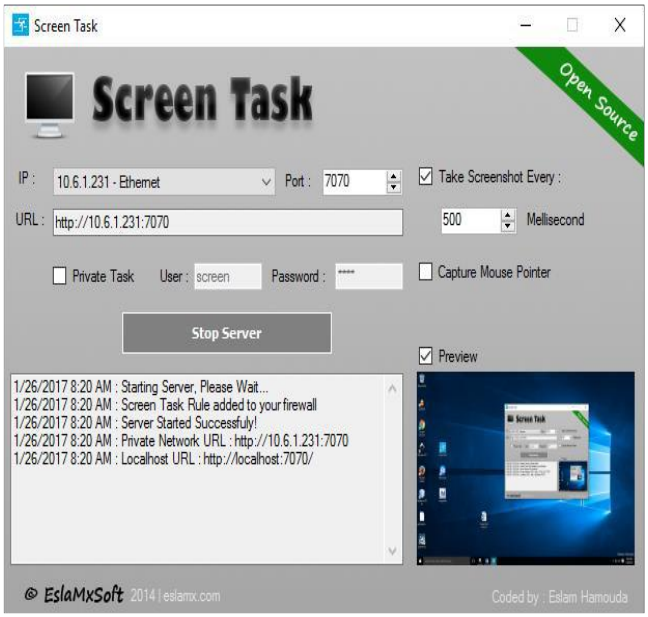

Figure 7: The Screen Task Application Window when Server is Ready

Students can open a browser [i.e.: Chrome] and enter the URL into the address bar. They will see the same image on their device as seen in the 'Preview'. A click on the 'Stop Server' button [Note: stopping Mirror Op does not disable what this app is displaying] makes whatever is done on the e-podium invisible to students that are seated in the classroom. Figure 5 shows the complete e-podium after installation.

CONCLUSION

This paper presents a solution that can improve learning experiences in higher institutions. Moreover, it would serve effectively in other places such as conference rooms, government houses, outside a hall, etc.

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